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ABSTRACT

The purpose of this study was to investigate the visual discrimination abilities of regular class children with varying levels of word recognition skill and of special class children. Word recognition and intelligence scores were obtained on 90 primary-aged children in regular classes and on seven children in a special class. The subjects were required to match twelve standard graphemes with an identical form when the identical form was placed with a maximum of twelve transformations of the standard. The graphemes used were copies of those developed by Gibson and included the standard forms and four kinds of transformation: line to curve, rotations and reversals, perspective, and close and break. The data were analyzed by means of a multivariate analysis, analysis of variance, and correlation coefficients. The results indicated that regular class pupils of differing levels of word recognition skill did not differ significantly by level in discrimination ability and that no significant relation existed between any of the visual discrimination skills and word recognition ability for the special class children. (Author/WR)

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A Comparison of Visual Discrimination Skills of Regular Class Pupils Categorized by Levels of Word Recognition Ability with Pupils Placed in a Special Class

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The relationship of visual perception and the ability to read has been a source of research interest in the academic community and a basis for teaching materials and methods in educational settings (Goins, 1958; Olson, 1966; Bruininks, 1969; Bryden, 1972; Gibson, 1962). Bryan (1964) and Phelan (1940) presented data which suggested that at the beginning of the primary level, the correlation of visual perceptual ability to reading is at its highest point. Frostig (1964) suggested that between the ages of three and one-half to seven and one-half the child's major developmental task is visual perception. Perhaps there could be a point in the child's level of development when visual discrimination skills are a critical factor in a child's reading behavior.

Because learning disabled children have been defined as having a deficit or a maturational lag in many of the visual perceptual processes related to reading behavior, Gibson's work in the discrimination of graphemes is particularly relevant. Gibson's work relates to the ability of young children to discriminate letters. Children identified as being learning disabled or minimally brain damaged are often considered to have discrimination skills and patterns which differ from the norm to such an extent that varying methods and techniques are introduced into a specialized curriculum to cope or compensate or train for this deficit (Hammill and Larson, 1974). Pupils who have difficulty in acquiring reading skill and who also present visual discrimination problems are often thought of as having learning patterns and developmental continua which differ from pupils who reached an

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acceptable level. Educational intervention programs often follow which stress visual perceptual deficits rather than reading behavior.

Purpose

The problem in this study was to investigate the visual discrimination abilities of regular children and of special class children who differ in their ability to recognize letters and words. Specifically, answers to three questions were sought:

1. Do pupils from primary regular classes categorized into high, average, and low levels of word recognition skill significantly differ in visual discrimination ability ?
2. Do pupils from a special class and a group from a regular class who are in the same level of reading skill differ significantly in visual discrimination skills?
3. Is the relationship between visual discrimination skills and word recognition skills different for pupils placed in a special class compared with regular class pupils?

Subjects

One school, to which children from all over the city were bussed, was selected from a system which has a total of 13 elementary schools. On the basis of Wide Range Achievement Test (WRAT) reading standard scores, all regular pupils from grades 1-3 were assigned to three levels of word recognition ability: high, standard scores from 110-129; average, standard scores from 90-109; and low, standard scores from 70-89. Five males and five females were then randomly selected from each of the word recognition ability groups at the first, second, and third grade levels. Scores from the Otis-Lennon Mental Ability Test-Elementary Level I were also obtained from the group selected. Subject's responses from these 90 regular

class pupils were analyzed to answer the question concerning differences in visual discrimination abilities of pupils with varying word recognition skills.

To answer the second and third question regarding visual discrimination differences between pupils placed in a regular and those in a special class, 7 pupils enrolled in an MBI class in the same school were compared with 11 third graders of similar age, IQ and reading score. The 11 pupils were selected from the sample of 90 children. The MBI classroom in this school contained the only facility for teaching pupils identified as MBI. They were placed on the basis of teacher judgement, psychometric data, medical evaluation, and parental permission.

Method

The discrimination task required S to match a standard grapheme with an identical form, when the identical form was placed with a maximum of 12 transformations of the standard. The graphemes used were copies of those developed by Gibson and included both the standard forms and four kinds of transformations: line to curve, rotations and reversals, perspective, and close and break.

Statistical Analysis

To answer the question about whether pupils with different levels of word recognition ability also differ in visual discrimination skill, data from the regular class pupils were analyzed by means of a multivariate analysis. To eliminate the influence of IQ, scores obtained for subjects on the Otis-Lennon Mental Abilities Test, Elementary Level I were covaried in this analysis.

To answer questions whether regular class and special class pupils of equal reading skill and IQ differed from each other on visual discrimination tasks, data were analyzed by means of an analysis of variance technique. Correlation coefficients between errors made on visual discrimination tasks and word recognition skill were computed for the special class and for the regular class pupils.

Results

Visual discrimination skills in regular class pupils of differing word recognition skills. Groups of pupils in grades one through three classified as low, average, or high in word recognition skill did not differ in their ability to match identical forms embedded in a row which included transformations of the figure, $F(12, 149) = 1.16$ $p < .31$.

Pupils did, however, become significantly better at matching the identical form with correct alternatives as they advanced through the grades. The multivariate analysis of covariance performed on the transformation errors (line to curve, close and break, etc.) was significant, $F(12, 140) = 3.41$ $p < .0004$ (Hotelling-Lawley's Trace). There was no grade x word recognition skill interaction, $F(24, 278) = 1.39$ $p < 0.11$.

Visual discrimination skills of special class pupils compared with regular class pupils. Data from the 7 children in an MBI class were compared with 11 selected from the large sample and matched on reading skill, IQ, and age. Because their standard scores were between 70-89, both groups would be classified as being in the low word recognition group. The data were submitted to six one-way analyses of variance. None of the analyses approached significance (all F ratios <1).

On the visual discrimination task, third graders placed in a special class don't appear to differ from third graders of equal IQ, age and reading ability who are placed in a regular class. For example, pupils in a special class did not make errors classified as rotations or reversals any more frequently than regular class pupils who were at the same reading and IQ level.

Relation between visual discrimination skill and word recognition ability. For the large group of primary-aged regular class children, no significant relation was found between visual discrimination skill and reading skill when the groups were categorized according to high, average and low reading skill.

Conclusion

Visual discrimination ability is not necessarily related to level of word recognition skill or diagnostic category. One cannot assume that a diagnostic label or a reading skill level necessarily indicates a particular visual discrimination strength or weakness.

When IQ was statistically controlled, regardless of label or level or word recognition skill, pupils were not different from one another in visual discrimination ability. Visual discrimination skills of the kind investigated in this study may not be critical to reading skill of primary-aged pupils of varying abilities in a regular or in a special classroom.

To be effective, intervention strategies must be related to individuals rather than to levels of achievment or to labels attached to a category of disability. Each pupil, whether at a low, average or high level of reading ability or whether in a regular or in a special classroom presents a unique combination of visual discrimination ability and word recognition skill.

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